MAUL FOSTER ALONGI

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January 26, 2015
Project No. 8128.01.20

Mr. Dana Bayuk
Oregon Department of Environmental Quality
700 NE Multnomah Street, Suite 600
Portland, Oregon 97232

Re: Final Revised Groundwater Performance Monitoring Program to Incorporate Monitoring Wells WS-21-112 and WS-26-86—Siltronic Corporation, 7200 NW Front Avenue, Portland, OR—ECSI No. 183

Dear Mr. Bayuk:

Maul Foster & Alongi, Inc. (MFA) has prepared this memorandum in response to recent communications (summarized below) regarding the groundwater monitoring program at the Siltronic Corporation (Siltronic) facility. The monitoring is being conducted in accordance with the requirements of the *Order Requiring Remedial Investigation and Source Control Measures*, Oregon Department of Environmental Quality (DEQ) No. VC-NWR-03-16, entered into with Siltronic on February 9, 2004.

SUMMARY OF COMMUNICATIONS

DEQ's e-mail to Northwest Natural (NW Natural) on September 17, 2015 (with the subject "RE: Gasco: Groundwater Quality Monitoring Data Report and Aqua Gard Memo") directed NW Natural to collect samples from monitoring wells WS-21-112 and WS-26-86 as a "component of long-term groundwater monitoring program for cVOCs, MGP constituents, and EIB performance at the Siltronic Site." NW Natural collected groundwater samples from the two wells in September.

On October 1, DEQ provided an e-mail to MFA with the subject "Siltronic EIB Groundwater Performance Monitoring Program." In the e-mail, DEQ required Siltronic to collect and analyze groundwater samples from monitoring wells WS-21-112 and WS-26-86 consistent with the Siltronic EIB performance monitoring program. On October 7, MFA provided a response to DEQ's October 1 e-mail, and outlined Siltronic's understanding of the groundwater monitoring program associated with the above-referenced wells. On October 20, DEQ provided an e-mail response to the October 7 e-mail and October 6 phone call, and suggested further discussion. In response, MFA provided DEQ with a memorandum describing the incorporation of monitoring wells WS-21-112 and WS-26-86 into the performance monitoring program on November 20. On December 1, DEQ provided comments to the November 20 letter; this letter incorporates those comments, and additional comments from follow up phone conversations with DEQ on December 10, 2015 and January 21, 2016.

Since monitoring wells WS-21-112 and WS-26-86 are associated with groundwater monitoring requested by DEQ for the Siltronic site, Siltronic will assume the responsibility of sampling the two wells. The attached figure shows the location of the two monitoring wells.

GROUNDWATER SAMPLE COLLECTION PROCEDURES

Groundwater samples will be collected from monitoring wells WS-21-112 and WS-26-86, located on the Siltronic property. At the time of this letter, the two above-referenced wells are being used as control wells associated with NW Natural's hydraulic control and containment (HC&C) system. MFA will coordinate with NW Natural's contractors to remove equipment (i.e., transducers) from the wells to provide access for sample collection. It will be NW Natural's responsibility to monitor the HC&C system during sampling, since the transducer will have been removed to allow collection of the groundwater sample.

Groundwater sampling procedures will be performed consistent with previously approved sampling plans[1][2][3] and with sampling protocols included in U.S. Environmental Protection Agency (USEPA) SESDPROC-301-R3 and 542-S-02-001.

Consistent with the sampling procedures and protocols identified above, low-flow (minimal drawdown) methodology will be used during sample collection. Groundwater samples will be collected using an appropriate device such as a bladder pump or a submersible low-flow sampler (e.g., Readi-Flo2®). No sampling equipment will be permanently installed in the wells, since that would interfere with NW Natural's use of them as control wells. Depth-to-water readings will be measured with a water-level indicator, and stabilized parameter measurements, including temperature, specific conductivity, dissolved oxygen, pH, oxidation reduction potential, and turbidity, will be recorded.

Groundwater samples will be analyzed for the following:

- Volatile organic compounds by USEPA Method 8260B
- Polycyclic aromatic hydrocarbons (plus carbazole, dibenzofuran, 1-methylnaphthalene, and 2-methylnaphthalene) by USEPA Method 8270 selective ion monitoring
- Dissolved iron and manganese by USEPA Method 6020

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[1] 2003. Final Work Plan Groundwater Assessment. Prepared for Wacker Siltronic Corporation, Portland, Oregon by Maul Foster & Alongi, Inc., Portland, Oregon. June 10.

[2] 2006. Final Enhanced Bioremediation Pilot Study Work Plan. Prepared for Siltronic Corporation by Maul Foster & Alongi, Inc. Portland, Oregon. July 28.

[3] 2009. EIB Performance Monitoring Plan. Prepared for Siltronic Corporation by Maul Foster & Alongi, Inc. Portland, Oregon. August 31.

- Total metals (aluminum, antimony, arsenic, cadmium, chromium, copper, iron, lead, manganese, mercury, nickel, selenium, silver, thallium, vanadium, and zinc) by USEPA Method 6000 Series
- Total and dissolved organic carbon by SM 5310B
- Total mercury by USEPA 7470
- Permanent gases (acetylene, carbon dioxide, ethane, ethene, and methane) by American Society for Testing and Materials Method D1945
- Chloride and sulfate by USEPA Method 9056
- Total cyanide by USEPA Method 335.4
- Free cyanide by USEPA Method D-4282
- Available cyanide by USEPA Method OIA-1677

The initial (January/February 2016) sampling event for the two wells will also include the following analyses:

- Nitrate-nitrogen
- Sulfide by SM 4500-S2-F
- Alkalinity (total, bicarbonate, hydroxide, and carbonate) by SM2320B

The purpose of the above analyses is to compare groundwater conditions with previous sampling events. If the results of the analyses are consistent with previous sampling events, subsequent analyses for the above-referenced parameters will not be necessary.

GROUNDWATER MONITORING SCHEDULE

Groundwater monitoring of the two wells will be conducted on a quarterly or semiannual basis. The attached table shows the revised performance monitoring schedule as approved on December 16, 2014, and updates it to include monitoring wells WS-21-112 and WS-26-86. Upon DEQ approval, the first scheduled sampling event can be conducted in January or early February 2016.

Sincerely,

Maul Foster & Alongi, Inc.

Kerry-Cathlin Gallagher
Project Scientist

James G.D. Peale, RG
Principal Hydrogeologist

Attachments: Table
Figure

cc (electronic):
Myron Burr, Siltronic Corporation
Ilene Gaekwad, Davis Rothwell Earle and Xochihua
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Chris Reive, Jordan Ramis
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Bob Wyatt, NW Natural
Patty Dost, Pearl Legal Group LLC
John Edwards, Anchor QEA LLC
John Renda, Anchor QEA LLC
Ben Hung, Anchor QEA LLC
Rob Ede, Hahn and Associates, Inc.

TABLE

Table
Performance Monitoring Frequency
Last Revised 01/22/2016
Siltronic Corporation
Portland, OR

Well Group	Well	Frequency of Groundwater Sampling by Siltronic	MFA Transducer Installed?	Monitoring Objective
1	WS13-105	Quarterly	No	EIB Performance
	WS13-69	Quarterly	Yes	EIB Performance
	WS18-101	Quarterly	Yes	EIB Performance
	WS21-131*	Bimonthly	Yes	EIB Performance/HC&C Performance
	WS23-116*	Bimonthly	No	EIB Performance/HC&C Performance
	WS24-111*	Bimonthly	Yes	EIB Performance/HC&C Performance
	WS25-96*	Bimonthly	No	EIB Performance/HC&C Performance
	WS25-111*	Bimonthly	No	EIB Performance/HC&C Performance
	WS30-96	Quarterly	Yes	EIB Performance
	WS32-76	Quarterly	No	EIB Performance
	WS35-106	Quarterly	No	EIB Performance
	WS37-51	Quarterly	Yes	EIB Performance
	WS39-101	Quarterly	Yes	EIB Performance
	WS40-36	Quarterly	Yes	EIB Performance
	WS41-36	Quarterly	Yes	EIB Performance
	WS41-91	Quarterly	Yes	EIB Performance
	WS42-36	Quarterly	Yes	EIB Performance
2	WS8-33	NW Natural[a]	Not applicable	RI N&E
	WS8-59	NW Natural[a]	Not applicable	RI N&E
	WS12-125	NW Natural[a]	Not applicable	RI N&E
	WS12-161	NW Natural[a]	Not applicable	RI N&E
	WS15-140	Semiannual	Yes	EIB Performance
	WS18-71	Semiannual	No	EIB Performance
	WS19-71	Semiannual	No	EIB Performance
	WS19-101	Semiannual	No	EIB Performance
	WS21-112*	Quarterly	Yes	EIB Performance/HC&C Performance
	WS26-86	Semiannual	Yes	EIB Performance/HC&C Performance
	WS26-116*	Quarterly	No	EIB Performance/HC&C Performance
	WS27-86	Semiannual	No	HC&C Performance
	WS31-106	Semiannual	No	EIB Performance
	WS32-106	Semiannual	Yes	EIB Performance
	WS33-106	Semiannual	Yes	EIB Performance
	WS34-71	Semiannual	No	EIB Performance
	WS34-106	Semiannual	No	EIB Performance
	WS35-76	Semiannual	No	EIB Performance
	WS36-81	Semiannual	Yes	EIB Performance
	WS36-106	Semiannual	No	EIB Performance
	WS38-61	Semiannual	No	EIB Performance
3	WS15-85	Bimonthly	No	EIB Performance and cVOC Desorption
	WS33-81	Bimonthly	No	EIB Performance and cVOC Desorption
	WS43-36	Bimonthly	No	EIB Performance and cVOC Desorption
4	WS44-29	Quarterly	Yes	RI N&E
	WS45-23	Quarterly	Yes	RI N&E
	WS46-33	Quarterly	Yes	RI N&E
None	WS10-27	Suspended	No	Not applicable
	WS16-125	Suspended	No	Not applicable
	WS16-161	Suspended	Yes	Not applicable
	WS17-52	Suspended	No	Not applicable
	WS17-94	Suspended	No	Not applicable
	WS20-112	Suspended	No	Not applicable
	WS22-112	Suspended	No	Not applicable
	WS24-126	Suspended	No	Not applicable
	WS24-155	Suspended	Yes	Not applicable

NOTES:

Shaded cells identify revisions to the monitoring program since the previous DEQ-approved plan in December 2014.

* = cVOC data collected from the indicated wells are used to calculate the mass flux of cVOCs for comparison to RAO #2 criteria.

[a]Refer to the NW Natural monitoring program.

cVOC = chlorinated volatile organic compounds.

DEQ = Oregon Department of Environmental Quality.

EIB = enhanced in situ bioremediation.

HC&C = hydraulic control and containment.

N&E = nature and extent.

NW Natural = Northwest Natural.

RAO = remedial action objective.

RI = remedial investigation.

FIGURE

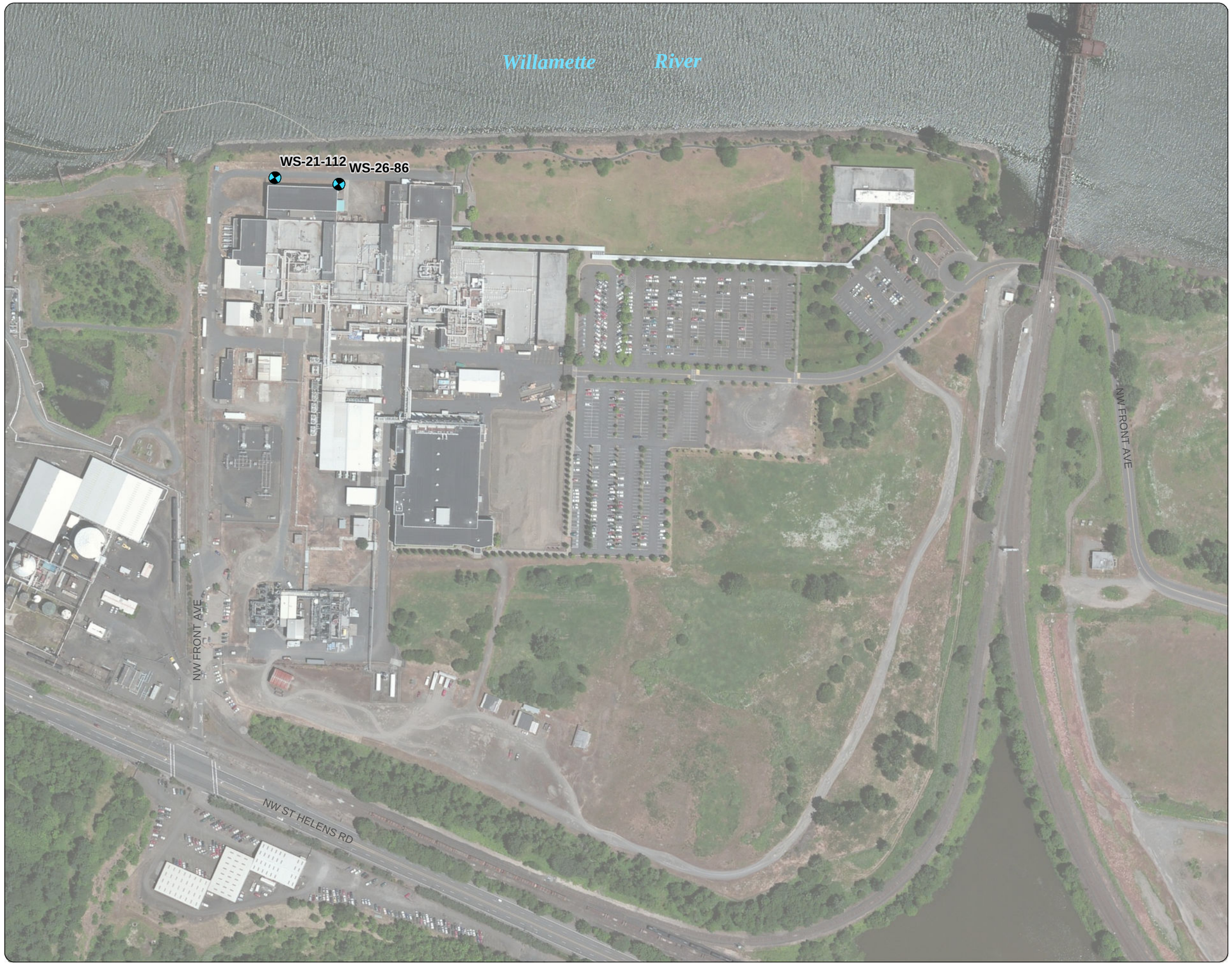

Figure
Monitoring Well Locations

Siltronic Corporation
Portland, Oregon

Legend

Monitoring Well

0 125 250
Feet

Source: Aerial photograph obtained from Esri ArcGIS Online

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